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K. KOHL

2,902,847

NEEDLE HOLDER

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FIG. 2.

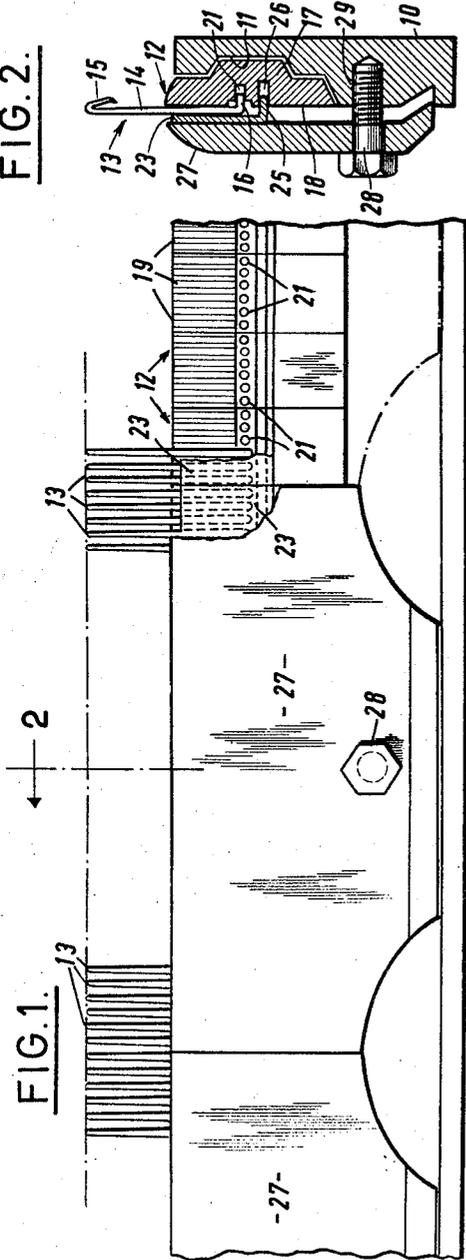


FIG. 3.

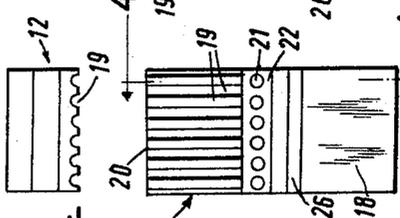


FIG. 4.

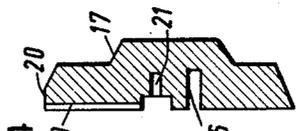


FIG. 6. FIG. 7.

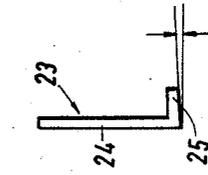


FIG. 8.

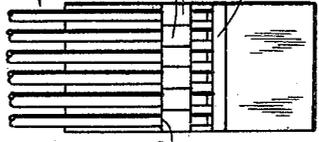
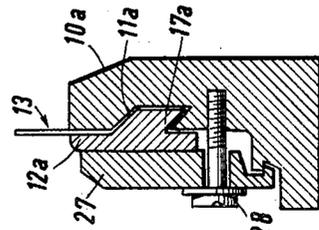


FIG. 9.



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HIS AGENT

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2,902,847

NEEDLE HOLDER

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8 Claims. (Cl. 66—114)

This invention relates to holders for needles or other accessory knitting elements of knitting machines. More specifically, the invention concerns multiple needle holders for machines using spring beard or latch type needles.

It is conventional in the art to mount a plurality of knitting needles in holders of cast metals or metal alloys such as lead or lead-zinc alloys and the like, the needles being irremovably anchored in the cast metal. Such needle holder units are quite heavy and the total weight of a substantial number of the holder units, as required in a single knitting machine, is such as to adversely affect the efficient operation of the machine going through the knitting cycles, particularly in the case of the higher speed and more sensitive tricot or Raschel type machines.

Furthermore, the conventional cast metal needle holder must be discarded as a unit when a single needle becomes defective for any reason. Since the remaining, non-defective needles of the discarded unit are not salvaged, there is necessarily an excessive consumption of needles which is altogether out of proportion to the number of actually defective needles.

While attempts have been made to replace the usual cast needle holder units with removable needle holding means, such attempts have proven inadequate in many respects. Thus, where the needle bar has been slotted to receive the needles, it has proven impractical to provide precision slotting for accurate location of the needles, particularly with needle bars of extended length, which may be as much as 168".

Furthermore, with the need for frequently replacing individual defective needles, the slots in the needle bar become worn, resulting in bad needle alignment and consequent inefficiencies in the knitting operations. Also, much time is lost when the machine is threaded up and fabric is knitted when the needles must be replaced directly on the needle bar. While it has been proposed to use brass inserts on the needle bar to reduce wear and distortion of the slots, such inserts not only increase the weight on the needle bar, but also leave the problem of excessive machine stoppage for needle replacement unsolved.

Accordingly, an object of this invention is to provide for use in knitting machines, small unitary needle holders adapted to have a plurality of needles removably mounted thereon, the holders being positioned in side by side relation on the needle bar and removably clamped thereto, whereby any unit containing a defective needle may be quickly removed from the needle bar and replaced by a similar unit, to reduce machine stoppage to an absolute minimum. The removed unit may be readily disassembled to permit the replacement of the defective needle and thus the unit may be restored to a condition permitting the same to be remounted on the needle bar when necessary, retaining all needles on the holder which are in good order since only the defective needle need be discarded.

Another object of this invention is to provide needle holder units of the character described and formed of light metals or alloys to materially reduce the weight on the needle bar, the units being precision slotted to receive thereon the individual needles in proper alignment and location, means being provided for anchoring the needles on the unit yet permitting easy assembly and disassembly of parts to allow replacement of any needle on the holder.

A further object of this invention is to provide an improved unitary needle holder including a minimum number of parts and adapted to be rapidly disassembled and assembled, yet insuring perfect alignment and location of the needles on the holder.

Yet another object of this invention is to provide an improved procedure for replacing defective needles on the needle bar of a knitting machine, wherein needles are removably mounted in holders, which in turn are removably mounted on the needle bar, the needles being retained on the holders by means removably related to the holder.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

In the drawing,

Fig. 1 is a front elevational view of a portion of the needle bar of a knitting machine, showing the needle holders embodying the invention;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a front elevational view of a needle holder;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a top plan view thereof;

Fig. 6 is an elevational view of the needle retaining means associated with the holder;

Fig. 7 is a partial perspective view of a modified form of needle; and

Fig. 8 is a front view of the holder for receiving the needles shown in Fig. 7.

Fig. 9 is a vertical sectional view of a modified form of the invention.

Referring in detail to the drawing, and particularly to Figs. 1 and 2, numeral 10 designates the conventional needle bar of a knitting machine, which may be of the tricot, Raschel or other known type. The bar 10, mounted on the machine, not shown, in a manner known in the art, is recessed on its front face and along the length of the same, as at 11, in a known manner.

On the needle bar 10, there are mounted in side by side relation, a plurality of unitary needle holders 12 embodying the instant invention. Such holders are formed of light metals or alloys thereof, such as of aluminum or magnesium, to keep their weight at a minimum and are adapted to be precision slotted to receive knitting needles 13, as hereinafter described.

Preferably, needles 13 may be of the conventional beard type, having a shank 14, a spring beard 15 at the upper end of the shank and means for locating the height of the needle relative to the holder, which may take the form of an inturned butt 16 at the lower end of the shank 14.

The individual, unitary holders 12 are formed on their rear face with a longitudinally extending projection 17 which is complementary to and receivable in recess 11 on the needle bar 10. The front face 18 of the holders 12 is formed with parallel, vertical slots 19 for receiving therein the shanks 14 of needles 13, said slots extending downwardly from the top edge 20 of the holder.

Means is provided for receiving the butts 16 of the needles 13, in the form of recesses 21 at the lower ends of slots 19, thereby positively locating the needles on the holder in respect to their projection above edge 20.

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The front face 18 of holders 12 is further formed with a longitudinal slot 22 extending transversely of the needle receiving slots 19 and communicating with recesses 21. Slot 22 facilitates the placement and removal of the individual needles 13 in slots 19 on the holder.

Means is provided for retaining the needles 13 in their slots 19 on the holders. Such retaining means, generally indicated at 23, is an angular member of spring metal including a rectangular plate portion 24 and a flange 25 at the lower end thereof. The plate and flange of member 23 preferably have an angular relationship of slightly less than 90°.

Each holder 12 is formed on its front face 18 with a retainer slot 26 extending transversely of needle slots 19 and located below slot 22. The slot 26 is at right angles to the holder face 18 and is adapted to receive therein the flange 25 of retaining means 23 and biasing the plate 24 towards the holder face. Thus, with the rear portions of plate 24 bearing against the shanks 14 of the needles 13, said needles are firmly retained and anchored in their respective slots 19.

The individual needle holder units 12 are mounted in side by side relation on the needle bar 10 with their rear projections 17 received in needle bar recess 11. The usual clamp plates 27 bear against the holders 12 and a bolt 28 passing through the plate and screwed into a threaded recess 29 on the bar 10 below recess 11, holds the individual holders firmly in place on the bar.

In the event that a needle 13 on any of the holders 12 becomes defective, the bolt 28 is unscrewed to release the holder and allow quick removal thereof from the needle bar and the immediate replacement with another holder 12 in which all the needles are in working order. The bolt 28 is tightened and a minimum delay in the operation of the knitting machine has been caused by the interchange of needle holders.

The needle holder 12, which has been removed from the needle bar 10, is readily disassembled by removing the retaining means 23, this being easily accomplished by inserting a tool into the retaining slot 26 at the ends thereof to snap the flange 25 out of slot 26. The defective needle is then removed from its slot 19 and replaced by a new needle and the retaining means is snapped back on the holder to anchor the needles thereon.

The individual holders 12 may vary in width in accordance with the number of needles to be mounted thereon. In turn, the number of needles is adjusted in terms of the gauge of the knitting machine for the material to be knitted thereon.

While needles 13 are shown with inturned butts 16 for locating the needles on the holders, other needle locating means may be used. Thus, as shown in Figs. 7, 8, the needles 13a may omit the inturned portions and are provided with an enlarged portion 16a at the lower end of shank 14a, such enlarged portion being received in slot 22 of the holder to accurately locate the needles on the holder. Also, with needles 13, having inturned butts 16, the retaining member 23 may be omitted, if desired, as such needles may be directly engaged by the clamp plates 27, while on holders 12.

As shown in Fig. 9, a modified form of needle holder 12a may be used in conjunction with needle bar 10a, wherein the recess 11a on said bar is inclined downwardly to receive a complementary projection 17a on holders 12a, thereby providing for a better association of the holders with the needle bar. Also, the needle slots in the holder now face the needle bar together with the needles 13 disposed therein. The clamp plates 27 engage the front face of the holders 12a. A felt or fiber strip, not shown, may be interposed between the needle shanks on holder 12a and the needle bar 10a to further improve the clamping action. Thus, the press action on needles 13 is now transmitted to the needle holder rather than to the clamp plates, as in the previously described forms of the invention.

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The needle holders of the instant invention are adapted to have mounted thereon various types of knitting needles including the latch type needles. Furthermore, other knitting elements, such as thread guides and the like, may be removably mounted in holders of the instant invention.

It will be apparent that there have been provided needle holders which are of minimum weight, thereby increasing the operational efficiency of the knitting machine. Furthermore such holders may be quickly removed from and replaced on the needle bar, reducing machine stoppage to a minimum. Finally, the holders are not discarded and individual defective needles are readily replaced on the holder in a simple manner, thereby effecting substantial economies in needle replacements.

As various changes may be made in the embodiments of the instant invention without departing from the spirit thereof, it is understood that all matter shown or described shall be interpreted as illustrative and not by way of limitation.

Having thus disclosed my invention, I claim as new and desire to protect by Letters Patent:

1. A needle holder comprising a needle supporting member, said member being formed with a plurality of needle receiving slots on the front face thereof, said member being further formed with a retainer slot below the lower ends of said needle slots and extending transversely thereof, and needle retaining means comprising a portion removably received in said retainer slot and a portion biased toward the front face of the member and adapted to bear against needles in said needle slots.

2. A needle holder as in claim 1 wherein said member includes means engageable with predetermined portions of said needles for vertically locating said needles on said holder.

3. A needle holder comprising a needle supporting member, said member being formed with a plurality of parallel needle slots on the front face thereof, needle retaining means removably mounted on said member, said retaining means comprising two connected portions resiliently movable in relation to each other and forming an angle therebetween and a means in the front face of the needle supporting member for receiving one of said needle retaining means portions, the receiving means and the front face of the needle supporting member enclosing an angle different from the angle between the two retaining means portions whereby the other needle retaining means portion is resiliently biased against the front face.

4. A needle holder comprising a light weight metal needle supporting member, said member being formed with a plurality of needle receiving slots opening on one face thereof and a retainer slot extending transversely of and below the lower ends of said needle slots, needle retaining means comprising plate and flange portions resiliently movable in relation to each other, said flange portion being removably received in the retainer slot on said member with said plate portion being biased towards said one face of the needle supporting member and the needle slots therein.

5. A needle holder as in claim 4 wherein the angle between the plate and flange portions of said retaining means in tensionless condition is slightly less than the angle between the retainer slot and the front face of said member.

6. A needle holder as in claim 5 wherein said member is formed with a locating slot extending transversely of said needle slots and above said retainer slot, said locating slot being operative to receive therein selected portions of the shank of needles disposed in said needle slots for vertically locating said needles on said member.

7. In a knitting machine, a needle bar, a plurality of needle holders removably mounted on said bar in side by

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side relation, each holder being formed with slots for removably receiving needles therein, a needle retaining means removably mounted on each needle holder for retaining needles on said holder, each needle retaining means including two connected portions resiliently movable in relation to each other, one portion being removably mounted in said needle holder and the other portion being resiliently biased against said slots, and means for clamping said needle holders on said needle bar.

8. A knitting machine as in claim 7 wherein each holder is formed with a retainer slot extending transversely of said needle slots and below the lower ends thereof for receiving the one portion of said retaining means.

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